

### **AMENDMENTS TO THE DRAWINGS**

The attached replacement sheet of drawings includes the Prior Art designation required by the Examiner for Figures 3a-4b. This sheet, which includes Figures 3a, 3b, 4a, and 4b replaces the original sheet including Figures 3a, 3b, 4a, and 4b.

No new matter is believed to be added by the present amendment to the drawings.

Attachment: Replacement Sheet

### **REMARKS**

The present Amendment is in response to the Examiner's Office Action mailed November 21, 2006. Claims 1-3, 5, 7-12, 14, 16-21, 24-25, and 27-28. Claims 1-28 are remain pending in view of the above amendments.

Please note that the following remarks are not intended to be an exhaustive enumeration of the distinctions between any cited references and the claimed invention. Rather, the distinctions identified and discussed below are presented solely by way of example to illustrate some of the differences between the claimed invention and the cited references. Reconsideration of the application is respectfully requested in view of the above amendments to the claims and the following remarks. For the Examiner's convenience and reference, Applicant's remarks are presented in the order in which the corresponding issues were raised in the Office Action.

### **Drawings**

The Examiner objected to Figures 3a-4b as only illustrating that which is old. The replacement sheet includes the (Prior Art) designation required by the Examiner.

### **Rejection Under 35 U.S.C. § 102**

The Office Action rejected claims 17-28 under 35 U.S.C. § 102(a) as being anticipated by Applicant's admitted prior art (AAPA). Applicant respectfully disagrees. Anticipation requires that all claim elements, as arranged in the claim, be taught in a single prior art reference. The following discussion illustrates that the cited art fails to satisfy the requirements of anticipation.

There are several elements of claim 17 that are not taught or suggested by the cited art. For example, the cladding layer required by claim 17 is arranged on top of said first set of layers, which is arranged in a first waveguide mesa, and the surrounding semiconductor material. Further, claim 17 requires that the cladding and contact layer be shaped in an etching process to have a first contact mesa structure at least above the first waveguide mesa.

Further, claim 17 requires, after the cladding layer is shaped in the etching process into a contact mesa structure, that an insulating material be applied around the

first contact mesa structure and that the insulating material have a thickness corresponding to approximately the combined thickness of the cladding and the contact layer.

The AAPA of Figures 1a and 1b fails to teach or suggest these limitations. More particularly, the AAPA fails to teach or suggest a cladding and contact layer that is shaped to have a first contact mesa structure at least above the first wave guide mesa.

More specifically, the cladding 7 in Figure 1a is not shaped to have a first contact mesa structure and no suggestion is made that the cladding layer is etched such that insulating material can be applied. Thus, Figure 1a fails to teach each and every element of claim 17.

With regard to Figure 1b, claim 17 requires that the first set of layers including the waveguide layer be arranged in a waveguide mesa. Figure 1b fails to teach this limitations. In addition, the cladding 7 in Figure 1b is not above a first waveguide mesa as required by claim 1 because the waveguide layers of Figure 1b have not been thusly formed. Further the insulating material 12 in Figure 1b is not around the first contact mesa structure as required by claim 17 because the first contact mesa structure of Figure 1b is not formed as a mesa structure as required by claim 17.

For at least these reasons, the AAPA fails to anticipate claim 17 and Applicants respectfully submit that claim 17, along with the dependent claims 18-28, are not taught or suggested by the cited art.

#### **Claim Rejections Under 35 U.S.C. § 103**

The Office Action rejected claims 1-28 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,226,310 (*Takagi*) in view of AAPA. Applicant respectfully disagrees.

For example, claim 1 requires etching the contact layer and the cladding layer using a second mask that covers the first waveguide mesa. Next, claim 1 requires applying insulating material in the areas not covered with the second mask or rather in the areas that were etched. By way of example only, this can result in the structure

illustrated in Figure 2c, where the cladding 7 surrounds the first waveguide layer 3 and where the insulating material 25 is applied in areas not covered by the second mask.

The cited art fails to teach at least these limitations. For example, the cladding layer 46 shown in Figure 3 of *Takagi* is not around the waveguide layer as required by claim 1, but only on top of the waveguide layer. The deficiencies of *Takagi* are not satisfied by AAPA, which fails to teach or suggest at least these limitations as discussed above.

In addition, claim 1 has been amended to require that the insulating material have a dielectric constant that is less than a dielectric constant of the cladding layer. The art fails to teach or suggest this requirement.

With regard to claim 17, *Takagi* fails to teach or suggest the required structure. For example, claim 17 requires that the cladding and contact layer are shaped in an etching process to have a first contact mesa structure at least around (see e.g., cladding 7 in Figure 2c) the first waveguide structure. In contrast, *Takagi* illustrates a cladding layer 46 that is only on top of the waveguide structure and not around the waveguide structure. Thus, *Takagi* fails to teach a cladding layer and the contact that have been shaped in an etching process to have a mesa structure at least around the first waveguide mesa. AAPA fails to remedy this deficiency of *Takagi*, among others.

For at least these reasons, Applicant respectfully submits that claims 1 and 17 and the dependent claims 2-16 and 18-28 are not taught or suggested by the cited art and are in condition for allowance.

### **Double Patenting**

The Examiner provisionally rejected claims 1-28 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-23 of copending Application No. 10/506,562.

Applicants submit herewith a terminal disclaimer relative to this Application to overcome the provisional rejection and rejection of the claims under nonstatutory obviousness-type double patenting. Withdrawal of this rejection and allowance of the pending claims is respectfully requested in view of the terminal disclaimer.

### **Conclusion**

In view of the foregoing, Applicants believe the claims as amended are in allowable form. In the event that the Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview, or which may be overcome by an Examiner's Amendment, the Examiner is requested to contact the undersigned attorney.

Dated this 21<sup>st</sup> day of March, 2007.

Respectfully submitted,

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